

### **REMARKS**

Claims 1, 3-6, 9-10, 12-16, 19-24, 26, and 32-36 were pending in the application. Claims 15, 16, 22-24, 26 and 35 are cancelled herein. New Claims 37-40 are added herein. Accordingly, Claims 1, 3-6, 9-10, 12-14, 19-21, 32-34 and 36-40 are now pending in the application.

While Applicant disagrees with the current rejections, Applicant has amended the claims to expedite prosecution. Applicant reserves the right to pursue the claims as originally filed in one or more continuing applications. Claims 1, 4, 5, 9, 10, 20, 32-34 and 36 are amended herein. Support for the amendments and new claims can be found throughout the written description, claims, and drawings as originally filed. Therefore, no new matter has been added. The Examiner is respectfully requested to reconsider and withdraw the rejections in view of the amendments and remarks contained herein.

### **INTERVIEW SUMMARY**

Applicant would like to thank the Examiner for courtesy extended during the telephone Interview of January 28, 2010. No exhibit was shown or demonstration conducted. The pending rejections and prior art references mentioned below were generally discussed. No agreement was reached during the Interview.

### **REJECTION UNDER 35 U.S.C. § 102**

Claims 1, 3-6, 9-10, 12-16, and 19 stand rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Pat. No. 6,715,597 ("Buchanan"). This rejection is respectfully traversed.

Claim 1 recites a controller that is configured to estimate at least one temperature state. The controller is configured to determine at least one of an approximate thermal inertia of a friction device and heat rejection of at least one of the friction device and a cooling system. The controller is configured to estimate the at least one temperature state based on at least one of the approximate thermal inertia and the heat rejection.

Buchanan does not at least show, teach or suggest a controller that is configured to estimate a temperature state based on: A) a determined approximate thermal inertia of a friction device; and/or B) determined heat rejection of at least one of a friction device and a cooling system.

The Examiner alleges that features A and B are disclosed in FIG. 3A of Buchanan. Applicant respectfully disagrees. FIG. 3A of Buchanan discloses steps performed in controlling a clutch transmission. None of the steps include determining an approximate thermal inertia and/or heat rejection. Note that the terms "thermal inertia", "inertia", "heat rejection" and "rejection" can not be found in Buchanan.

As best understood by Applicant, FIG. 3A discloses the monitoring, determining or using of a sump temperature, a cooling fluid temperature, an input torque, a slip speed, power transfer, bulk clutch temperature, cooling fluid flow, and engine speed. However, FIG. 3A does not disclose the monitoring, determining or using of thermal inertia and/or heat rejection, as claimed.

On pages 6 and 7 of the Office Action, the Examiner alleges that Applicant has not defined the terms "approximate thermal inertia" and "heat rejection" in the application. Applicant disagrees and submits that the terms are defined in paragraph

[0027] of the application, were defined in the Response of January 13, 2009, and are again defined below.

Approximate thermal inertia or thermal mass refers to the product of mass of a body and the specific heat capacity for the material of that body, and typically has a unit of measure of joules (J)/°C. Thermal inertia refers to a measure of thermal mass and the velocity of a thermal wave which controls the surface temperature of a material or body. Thermal inertia is the square root of the product of a bulk thermal conductivity and volumetric heat capacity of a material or body. Thermal inertia typically has a unit of measure of  $\text{Jm}^{-2}\text{K}^{-1}\text{s}^{-1/2}$  or  $\text{tiu}$ . Heat rejection refers to a rate at which a device releases heat for a particular temperature and typically has a unit of measure of watts (W)/°C.

Referring to MPEP 2111, if extrinsic reference sources evidence more than one definition for a term, the intrinsic record must be consulted to identify which of the different possible definitions is most consistent with Applicant' use of a term. See Brookhill-Wilk I, 334 F. 3d at 1300, 67 USPQ2d at 1137. As such, the intrinsic record must be reviewed to interpret and identify the appropriate and consistent definition of the terms "approximate thermal inertia" and "heat rejection". The intrinsic evidence includes the claims, the specification, and the prosecution history. See Zodiac Pool Care Inc. v. Hoffinger Indus. Inc., 206 F. 3d 1408, 1414, 54 USPQ2d 1141, 1145 (Fed. Cir. 2000).

The term approximate thermal inertia is defined in paragraph [0027] of the application as having the units of measure J/°C, which is consistent with its usage in the art. The term heat rejection is defined in paragraph [0027] as having the units of

measure  $W/^{\circ}C$ , which is consistent with its usage in the art. The units of measure  $J/^{\circ}C$  and  $W/^{\circ}C$  are also consistent with the definitions provided throughout the prosecution history of the application.

Applicant further submits that parameters that are known to one skilled in the art, such as temperature, thermal inertia and heat rejection do not require an explicit definition. A patent specification need not teach, and preferably omits, what is well known in the art. See Hybritech Inc. v. Monoclonal Antibodies, Inc., 802 F.2d 1367, 1384, 231 USPQ 81, 94 (Fed. Cir. 1986).

During the Interview, the Examiner alleged that since fluid of the clutch transmission of Buchanan has inertia, Buchanan must determine thermal inertia when controlling the clutch transmission. Applicant disagrees. A clutch transmission may be controlled without determining thermal inertia. As stated above, Buchanan controls the clutch transmission based on a sump temperature, a cooling fluid temperature, an input torque, a slip speed, power transfer, bulk clutch temperature, cooling fluid flow, and engine speed. Buchanan does not control the clutch transmission based on a determination of thermal inertia.

During the Interview, the Examiner alleged that because Buchanan discloses determining temperature change, Buchanan discloses determining heat rejection. Applicant disagrees. Although temperature change may be related to heat rejection, change in temperature is not the same as heat rejection. Temperature change is equal to a difference between two detected temperatures. For example, a first temperature  $T_1$  minus a second temperature  $T_2$  equals a change in temperature  $\Delta T$ , which may be

measured in °C. Heat rejection  $K_{diss}$  is measured in W/°C. Heat rejection is based not only on temperature, but is also based on heat release rate of a device.

Thus, since the parameters determined in Buchanan and that of Claim 1 are different, the control logic of the system of Buchanan is different and performs differently than the control logic associated with the system of Claim 1. Thus, Buchanan does not disclose each and every feature of Claim 1.

The Court of Appeals for the Federal Circuit has recently stated: “We thus hold that unless a reference discloses within the four corners of the document not only all of the limitations claimed but also all of the limitations arranged or combined in the same way as recited in the claim, it cannot be said to prove prior invention of the thing claimed and, thus, cannot anticipate under 35 U.S.C. §102....” Net MoneyIN Inc. v. VeriSign Inc., 88 USPQ2d 1751, 1759-1760 (Fed. Cir. 2008).

Therefore, Claim 1 is allowable for at least the above reasons. Claims 3-6, 9, 32-34 and 36-38 ultimately depend from Claim 1 and are allowable for at least similar reasons.

#### **REJECTION UNDER 35 U.S.C. § 103**

Claims 20-24, 26, and 34 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Buchanan in view of U.S. Pat. No. 5,950,789 (“Hosseini”). This rejection is respectfully traversed.

Claim 10 recites a method that includes: I) determining a loop time of a thermal model of a friction device; and II) estimating a temperature state of a component of the friction device based on the loop time.

With respect to Claim 10, Buchanan does not at least show, teach or suggest limitations I and II.

The Examiner alleges that estimating a temperature state of a component of a friction device based on a loop time is disclosed in FIG 3A of Buchanan. Applicant is unable to find in FIG. 3A or anywhere else in Buchanan mention of a loop time, loop time of a thermal model, or estimation of a temperature state based on a loop time.

On page 7 of the Office Action, the Examiner alleges that Applicant has not defined the term “loop time” in the application. Applicant disagrees. The term loop time is at least implicitly defined in the application and would be readily understood by one skilled in the art. In paragraph [0027], Applicant recited a loop time  $\Delta t$  of a thermal model. Applicant also provided an example loop in FIG. 2, which is identified and described in paragraphs [0032]-[0034] of the application.

A loop time refers to a period of time to perform an iteration of multiple tasks. See the example loop of FIG. 2 of the application. A loop time of a thermal module may refer to the time to perform the tasks of or related to the thermal model. As an example, a thermal model such as that disclosed in the application includes multiple parameters, which are iteratively determined. Each of the iterations may be referred to as a loop. Thus, the time to perform a single iteration is the loop time of that iteration or loop. As another example, FIG. 2 of the application illustrates a method that includes using a thermal module and involves iteratively performing steps 104-112. The time to perform one iteration of the steps 104-112 may be referred to as a loop time of a thermal model. Regardless of the definition of the term loop time, Buchanan does not perform a task based on a determine period of time.

During the Interview, the Examiner alleged that since there is time associated with the steps of FIG. 3A of Buchanan, that Buchanan discloses estimating a temperature state based on a loop time. Applicant disagrees. Although there may be time associated with performing the steps of FIG. 3A, that does not suggest that one of the steps are performed based on: a determined period of time; a determined loop time and/or a determined loop time of a thermal model. The steps of FIG. 3A are performed based on other parameters, which are stated above.

Therefore, Claim 10 is allowable for at least the above reasons. Claims 12-14 and 19 ultimately depend from Claim 10 and are allowable for at least similar reasons.

Claim 20 recites: i) determining a value based on heat rate, heat rejection of a friction device, and sump temperature; and ii) estimating a temperature state based on a thermal model of the friction device. Claim 20 also recites that iii) the thermal model performs as a low-pass filter that tracks the value.

Buchanan does not at least show, teach or suggest limitations i-iii. The Examiner admits that Buchanan does not disclose a low pass filter. Thus, Buchanan does not disclose a thermal model of a friction device that performs as a low-pass filter. The Examiner, however, alleges that Hosseini et al. (U.S. Pat. No. 5,950,789) discloses a low pass filter.

Hosseini discloses the use of a low pass digital filter to provide an average clutch slip value. The low pass digital filter is used to filter a determined average clutch slip value. In other words, a low pass filter is added to the system to filter a determined value. Hosseini does not disclose a thermal model of a friction device that performs as a low pass filter. A thermal model represents thermal characteristics of a device and typically includes multiple parameters. The filter of Hosseini is not part of nor does it represent a thermal model of a device. The filter of Hosseini is merely added to an existing system to filter a single parameter.

Also, neither Buchanan nor Hosseini discloses a low pass filter that tracks a value based on heat rate, heat rejection of a friction device, and sump temperature. Thus, Buchanan and Hosseini alone or in combination do not disclose each and every element of Claim 20.

Furthermore, the combination of Buchanan and Hosseini would not suggest a thermal model that performs as a low pass filter. The combination of Buchanan and Hosseini suggests applying a digital filter to clutch slip values to determine an average clutch slip value. Thus, at best, the combination of Buchanan and Hosseini suggests digitally filtering a parameter (e.g., slip speed) of Buchanan. Neither reference suggests using or modifying a thermal model to perform as a filter.

Therefore, Claim 20 is allowable for at least the above reasons. Claims 21-24, 26 ultimately depend from Claim 20 and are allowable for at least similar reasons.

It is a longstanding rule that to establish a prima facie case of obviousness of a claimed invention, all of the claim limitations must be taught or suggested by the prior art. In re Royka, 180 USPQ 143 (CCPA 1974). See MPEP § 2143.03. For at least the



above reasons, Applicant respectfully asserts that Claim 10 and 20 define over the cited art. Claims 12-14, 19, 21, 39 and 40 ultimately depend from Claims 10 and 20 and are allowable for at least similar reasons.

**ALLOWABLE SUBJECT MATTER**


The Examiner states that Claims 33 and 35-36 would be allowable if rewritten in independent form. Accordingly, Applicant has amended Claim 34 to include the limitations of Claim 1 and 35. Therefore, Claims 34 should now be in condition for allowance. Claim 36 now depends from Claim 34 and should be in condition for allowance for at least similar reasons.

## CONCLUSION

It is believed that all of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicant therefore respectfully requests that the Examiner reconsider and withdraw all presently outstanding rejections. It is believed that a full and complete response has been made to the outstanding Office Action and the present application is in condition for allowance. Thus, prompt and favorable consideration of this amendment is respectfully requested. If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (248) 641-1600.

Respectfully submitted,

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